

# SHUAI ZHOU

Senior Undergraduate Student of Robotics

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## SUMMARY

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**Research Interests:** I am primarily interested in developing next-generation decision-making systems for robotics, unifying *planning and learning*, and further enabling *multi-robot collaboration*, *safe human-robot interaction*. I envision such systems as *assistive robots in daily living support* serving more people with disabilities.

**Highlights:** 2 years of research experience with a solid mathematical and theoretical background; 4 years of programming experience with multiple languages; Half-year of experience with real robots across various platforms.

**Relevant Courses:** Theory and Technology of Robotics(A); Artificial Intelligence(A); Data Analysis and Modeling(A); Data Structures(A); Designing Information Devices and Systems(A); Modeling, Analysis, and Control of Dynamic Systems(A); Design and Manufacturing I, II(A); Linear Algebra and Analytic Geometry(A); Probability and Statistics(A); Calculus(A);

## EDUCATION

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### SOUTH CHINA UNIVERSITY OF TECHNOLOGY

Bachelor of Engineering in Robotics; GPA: 3.86/4.00

Guangzhou, China  
Sep 2022 — Jun 2026 (Expected)

### CARNEGIE MELLON UNIVERSITY

Visiting Student in Robotics Institute; Host: Prof. [Jiaoyang Li](#)

Pittsburgh, United States  
Jun 2025 — Feb 2026 (Expected)

### UNIVERSITY OF CALIFORNIA, BERKELEY

Exchange Student concentrate in EECS; GPA: 4.00/4.00

Berkeley, United States  
Aug 2023 — Dec 2023

## PUBLICATION(† equal contribution)

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### PREPRINT

#### Bridging Planning and Execution: Multi-Agent Path Finding Under Real World Deadlines

Jingtian Yan†, [Shuai Zhou](#)†, Stephen Smith, Jiaoyang Li

— Under Review

- Proposed a general MAPF framework that bridges the gap between planning and real-world execution (REMAP).
- Incorporated an execution-time predictor (ExecTimeNet) with planners to solve the MAPF with Real-world Deadlines.
- Achieved 20% less cost in realistic simulations and deployment.

### CONFERENCE PROCEEDING

#### LSRP\*: Scalable and Anytime Planning for Multi-Agent Path Finding with Asynchronous Actions

[Shuai Zhou](#), Shizhe Zhao, Zhongqiang Ren | [\[Paper\]](#) | [\[Web\]](#) |

— In SoCS 2025

- Extended LSRP planner to an anytime search framework with completeness and optimality guarantees.
- Identified and corrected theoretical flaws in prior work's state grouping.
- Scaled to 1,000 robots with near-optimal solutions within limited runtime and eventually converged to the optimal one.

#### Loosely Synchronized Rule-Based Planning for Multi-Agent Path Finding with Asynchronous Actions

[Shuai Zhou](#), Shizhe Zhao, Zhongqiang Ren | [\[Paper\]](#) | [\[Code\]](#) | [\[Web\]](#) |

— In AAAI 2025

- Proposed a novel rule-based approach to Multi-Agent Path Finding with Asynchronous Actions.
- Combined asynchronous search-state and rule-based interaction to avoid both deadlock and livelock.
- Demonstrated ability to handle 10× more agents than baselines with only 25% longer makespan.

## SKILL

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**Professional Services:** Reviewer (IROS 2025)

**Robot Platforms:** Unitree G1 Humanoid, Unitree Go1 Quadruped, UFACTORY X-ARM 7

**Robot Simulations:** IsaacLab, Mujoco, Pybullet

**Programming Languages:** Python, C++, Java, HTML, MATLAB,  $\text{\LaTeX}$

**Operating Systems:** Windows, Linux(Ubuntu)

**Online learning:** MIT: 6.S184 Generative AI with Stochastic Differential Equations, UC Berkeley: CS 285 Deep Reinforcement Learning, CMU: 16-831 Introduction to Robot Learning, CMU: 10-301/601 Introduction to Machine Learning, CMU: 16745 Optimal Control and Reinforcement Learning, CMU: 16-782 Planning and Decision-making in Robotics, UPenn: Robotics: Computational Motion Planning, UPenn: Robotics: Aerial Robotics

## RESEARCH PROJECT EXPERIENCE(lead and co-lead)

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### LEARNING CROSS-EMBODIMENT MANIPULATION WITH HUMAN DEMONSTRATIONS

CARNEGIE MELLON UNIVERSITY, [SAFE AI Lab](#)

Pittsburgh, United States

Research Intern; Supervised by Prof. [Ding Zhao](#)

Sep 2025 — Present

- Improving Cross-Embodiment manipulation model with flow-matching action-head for better generalization.
- Developing a who-body controller for the humanoid with reinforcement learning and imitation learning (teacher-student).
- Collaborating with Stanford to collect a comprehensive physical robot dataset for tool use.
- Evaluating learned policies in simulation (IsaacLab) and physical robots (G1 Humanoid, Go1 Quadruped, X-ARM).

### COLLABORATIVE MULTI-ROBOT TASK AND MOTION PLANNING

CARNEGIE MELLON UNIVERSITY, [ARCS Lab](#)

Pittsburgh, United States

Research Intern; Supervised by Prof. [Jiaoyang Li](#)

Sep 2025 — Present

- Proposing planning methods that search and sample manipulation motions learned by flow-matching cogeneration.
- Evaluating algorithms (C++, Python) in Mujoco simulation and on mobile robots.

### BRIDGING PLANNING AND EXECUTION FOR REAL-WORLD ROBOT COORDINATION

CARNEGIE MELLON UNIVERSITY, [ARCS Lab](#)

Pittsburgh, United States

Research Intern; Supervised by Prof. [Jiaoyang Li](#)

Apr 2025 — Present

- Bridging path planning and execution by introducing Multi-Agent Path Finding with Real-world Feedback.
- Learning execution-time prediction models for real-world planning feedback.
- Developing a closed-loop planning execution framework with the learned model to replan and reset the dependency.
- Evaluating algorithms(C++, Python) in simulation and mobile robots. Co-first-author paper is under review.

### SCALABLE PATH PLANNING FOR MULTI-ROBOT WITH ASYNCHRONOUS ACTIONS

UNIVERSITY OF CALIFORNIA, IRVINE, [IDM Lab](#)

Irvine, United States

Research Collaboration; Supervised by Prof. [Sven Koenig](#)

Mar 2025 — Jul 2025

- Developed an unbounded suboptimal anytime planner for Multi-Agent Path Finding with Asynchronous Actions.
- Proposed congestion-aware heuristics and look-ahead mechanisms to improve solution refinement.
- Evaluated algorithms (C++) in grid-based simulation. One first-author journal paper is under preparation.

SHANGHAI JIAO TONG UNIVERSITY, [RAP Lab](#)

Shanghai, China

Research Intern; Supervised by Prof. [Zhongqiang Ren](#)

Apr 2024 — Sep 2025

- Developed scalable planners for Multi-Agent Path Finding with Asynchronous Actions that scale to 1,000+ robots.
- Proposed wait-move synchronization for asynchronous rule-based robot interactions to avoid both deadlock and livelock.
- Designed complete, anytime planning framework with proposed pruning and sorting strategies that accelerated search.
- Evaluated algorithms (C++) in grid-based simulation and analyzing theoretical properties (completeness, optimality). One first-author paper accepted by **AAAI 2025** and one extended abstract accepted by **SoCS 2025**.

## WORK EXPERIENCE

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QT STEAM Education, Winter Robot Camp

Shenzhen, China

Teaching Assistant

Jan 2024 — Feb 2024

- Taught fundamentals of C programming, ROS basics, and circuit board design.
- Provided hands-on mentorship to help high school students build simple autonomous navigation robots.

South China University of Technology, Volunteer Work

Guangzhou, China

Volunteer

Mar 2023 — Present

- Completed 40+ hours of volunteer service, including organizing student sports meets and college admission interviews, supporting campus open days and international events, and assisting with school anniversary celebrations.

## HONARS AND AWARDS

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Outstanding Visiting Student Fellowship from USIEA

Guangzhou, China

Awarded to the top student in the UC Berkeley Global Access program; received 6,000 CNY

Mar 2024

Merit Student of South China University of Technology

Guangzhou, China

Top student in Robotics Engineering, Class of 2022

Feb 2024

The Third Prize Scholarship by South China University of Technology

Guangzhou, China

Top 10% of students, receiving 10,000 CNY

Dec 2023

Exchange Student Fellowship from South China University of Technology

Guangzhou, China

Awarded to outstanding students for overseas exchange, receiving 40,000 CNY

Jul 2023